

WHAT IS CLAIMED IS:

1. A mobile communication device having a plurality of communication systems supporting different frequency bands, comprising:

an antenna;

a transmitter for each of the plurality of communication systems;

a receiver for each of the plurality of communication systems;

a diplexer transmitting transmission signals from the plurality of communication systems to said antenna, and distributing reception signals received via said antenna to the plurality of communication systems;

a high-frequency switch for each of the plurality of communication systems, arranged to switch the signals between said transmitter and said receiver; and

a directional coupler extracting portions of the transmission signals, and sending the results to an automatic gain control circuit, said directional coupler being disposed between said antenna and said diplexer.

2. A high-frequency composite unit used in a mobile communication device according to Claim 1, said high-frequency composite unit including a microwave circuit

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carrying the plurality of communication systems, wherein said high-frequency composite unit is defined by a multilayer substrate including a laminated body including a plurality of dielectric layers, the multilayer substrate having said diplexer, said high-frequency switches, and said directional coupler.

3. A high-frequency composite unit according to Claim 2, wherein said diplexer includes an inductance element and a capacitance element, said high-frequency switch includes a switching element, an inductance element, and a capacitance element, and said directional coupler includes a primary line and a secondary line, the multilayer substrate includes the switching element, the inductance element, the capacitance element, the primary line, and the secondary line, and the multilayer substrate includes a connector connecting the switching element, the inductance element, the capacitance element, the primary line, and the secondary line.

4. A mobile communication device according to Claim 1, further comprising high-frequency filters, said high-frequency filters being arranged subsequent to said high-frequency switches and being connected to said receivers.

5. A high-frequency composite unit used in a mobile communication device according to Claim 4, said high-frequency composite unit including a microwave circuit carrying the plurality of communication systems, wherein said high-frequency composite unit includes a multilayer substrate having a laminated body defined by a plurality of dielectric layers, the multilayer substrate having said diplexer, said high-frequency switches, and said directional coupler.

6. A high-frequency composite unit according to Claim 5, wherein said diplexer includes an inductance element and a capacitance element, said high-frequency switch includes a switching element, an inductance element, and a capacitance element, and said directional coupler includes a primary line and a secondary line, the multilayer substrate includes the switching element, the inductance element, the capacitance element, the primary line, and the secondary line, and the multilayer substrate further includes a connector connecting the switching element, the inductance element, the capacitance element, the primary line, and the secondary line.

7. A mobile communication device according to Claim 1, wherein said plurality of communication systems include DCS

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and GSM systems.

8. A mobile communication device according to claim 1, wherein a notch filter is provided between said transmitters and said high-frequency switches.

9. A mobile communication device according to Claim 1, wherein said directional coupler includes a port.

10. A mobile communication device according to Claim 1, wherein said diplexer includes inductance elements and capacitors.

11. A dual-band cellular phone device having two communication systems supporting different frequency bands, comprising:

an antenna;

a transmitter for each of the two communication systems;

a receiver for each of the two communication systems;
a diplexer transmitting transmission signals from the two communication systems to said antenna, and distributing reception signals received via said antenna to the two communication systems;

a high-frequency switch for each of the two

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communication systems, arranged to switch the signals between said transmitter and said receiver; and

a directional coupler extracting portions of the transmission signals, and sending the results to an automatic gain control circuit, said directional coupler being disposed between said antenna and said diplexer.

12 A high-frequency composite unit used in a dual-band cellular phone device according to Claim 11, said high-frequency composite unit including a microwave circuit carrying the two communication systems, wherein said high-frequency composite unit is defined by a multilayer substrate including a laminated body having a plurality of dielectric layers, the multilayer substrate having said diplexer, said high-frequency switches, and said directional coupler.

13. A high-frequency composite unit according to Claim 12, wherein said diplexer includes an inductance element and a capacitance element, said high-frequency switch includes a switching element, an inductance element, and a capacitance element, and said directional coupler includes a primary line and a secondary line, the multilayer substrate includes the switching element, the inductance element, the capacitance element, the primary line, and the secondary

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line, and the multilayer substrate further includes a connector connecting the switching element, the inductance element, the capacitance element, the primary line, and the secondary line.

14. A dual-band cellular phone device according to Claim 11, further comprising high-frequency filters, said high-frequency filters being arranged subsequent to said high-frequency switches and being connected to said receivers.

15. A high-frequency composite unit used in a dual-band cellular phone device according to Claim 14, said high-frequency composite unit including a microwave circuit carrying the two communication systems, wherein said high-frequency composite unit includes a multilayer substrate having a laminated body defined by a plurality of dielectric layers, the multilayer substrate having said diplexer, said high-frequency switches, and said directional coupler.

16. A high-frequency composite unit according to Claim 15, wherein said diplexer includes an inductance element and a capacitance element, said high-frequency switch includes a switching element, an inductance element, and a capacitance element, and said directional coupler includes a primary

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line and a secondary line, the multilayer substrate includes the switching element, the inductance element, the capacitance element, the primary line, and the secondary line, and the multilayer substrate further includes a connector connecting the switching element, the inductance element, the capacitance element, the primary line, and the secondary line.

17. A dual-band cellular phone device according to Claim 11, wherein said two communication systems include DCS and GSM systems.

18. A dual-band cellular phone device according to claim 11, wherein a notch filter is provided between said transmitters and said high-frequency switches.

19. A dual-band cellular phone device according to Claim 11, wherein said directional coupler includes a port.

20. A dual-band cellular phone device according to Claim 11, wherein said diplexer includes inductance elements and capacitors.

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